



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,217	06/30/2003	Arthur E. Dixon	58305.0005	1800
24629	7590	09/07/2005	EXAMINER	
DARYL W SCHNURR MILLER THOMSON LLP PO BOX 578 SUITE 700, 22 FREDERICK STREET KITCHENER, ON N2G 4A2 CANADA			CONSILVIO, MARK J	
			ART UNIT	PAPER NUMBER
			2872	
DATE MAILED: 09/07/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/608,217

Applicant(s)

DIXON ET AL.

Examiner

Mark Consilvio

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2005.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 23 is/are pending in the application.
 4a) Of the above claim(s) 3-6 is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1, 2, 7-21 and 23 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____.
 5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 6/21/2005 have been fully considered but they are not persuasive.

In response to applicant's arguments that White does not teach a scan lens with an external entrance pupil, the examiner respectfully disagrees. Since no special definition for a scan lens is disclosed in the specification, scan lens is broadly interpreted in light of the specification. The lens of the objective 20 is properly read as a scan lens since a scanning beam is directed over the lens for scanning of an object. Likewise, no special definition is given to an external entrance pupil. Though not expressly disclosed, the objective 20 inherently has an entrance pupil. The entrance pupil is the image of the aperture stop as seen from a point on the optical axis in the object plane. The further limitation of the entrance pupil as external is read broadly to convey an aspect of the location of the entrance pupil. However, since no further limitation as to the pupil's location is provided in the claim, the external entrance pupil claimed does not distinguish over the inherent entrance pupil of the reference.

In response to applicant's arguments that White does not teach an immersion liquid filling the space between the objective 20 and the specimen 22, the examiner respectfully disagrees. White seems to show an immersion fluid between the specimen and objective in fig. 1. White does disclose that an oil immersion fluid is used at the condenser (col. 6, lines 8-12) and shows the same representation of a fluid at the objective. Further, White clearly discloses that the objective has a numerical aperture of 1.4 (col. 8, lines 15-20). Since air is unable to produce a

Art Unit: 2872

numerical aperture greater than 1, clearly an immersion fluid with a greater refractive index must be used. Thus, one of ordinary skill can clearly recognize that the element between the objective and specimen is an immersion fluid.

In response to applicant's arguments that Stimson does not teach a scan lens with an external entrance pupil, the same interpretation applies as stated supra regarding the same deficiency in White. Further, it is noted that Dixon expressly teaches both a scan lens and entrance pupil and the Stimson reference has been applied for its teaching of an immersion fluid with a scanning system.

In response to applicant's argument that the optical system of Stimson will not work if used in the present invention nor is properly combinable with the Dixon reference, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference or the disclosed invention of the applicant; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., size of the field of view) is not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that there is no suggestion to combine the White and Dixon references, the examiner recognizes that obviousness can only be established by

Art Unit: 2872

combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, motivation can be found in the knowledge generally available to one of ordinary skill. It is well known that immersion fluids can be used to increase the light-gather power of the objective, and hence resolution, by increasing the effective numerical aperture.

Applicant's arguments that applicant's invention has produced an unexpected result fails to comply with 37 CFR 1.111(b) because it amounts to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. An allegation of unexpected results requires applicant to provide evidence pursuant MPEP § 716.02.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by White et al. (US Patent No. 6,169,289).

Art Unit: 2872

With respect to claim 21, White et al. discloses a liquid immersion scan lens comprising a scan lens (20) for use with an object (22), said scan lens having an external entrance pupil (top of 20) for focusing light on said object in a prescribed object plane (23), said scan lens having an immersion liquid filling a space between said scan lens and said object (fig. 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7/1, 7/2/1, 8/1, 8/2, 9/1, 9/2/1, 10/1, 10/2/1, 11/1, 11/2/1, 14-17, 19/1, 19/2/1, 19/14/1, 20/1, 20/2/1 and 20/14/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of Stimson et al. (US Patent No. 6,134,002).

With respect to claim 1, Dixon et al. discloses a scanning beam optical imaging system for macroscopic imaging of an object, said system comprising: a) an illumination source (102) producing a light beam (103) directed upon an optical path toward an object (130); b) a scan lens (302) having an external entrance pupil (304), for focusing said light beam to a diffraction-limited configuration in a prescribed object plane; c) a scanner (114, 120) for scanning said light beam to move said diffraction-limited configuration in a pre-determined scan pattern on said object plane; and e) a detector (156) located to receive light from said object plane and a display (412) to produce a signal from said detector. Though Dixon et al. teaches a variety of different scan lens may be used, Dixon et al. is silent to a liquid immersion scan lens. Stimson et al.

Art Unit: 2872

discloses a scan lens (326) being a liquid immersion scan lens with an immersion liquid (oil) filling a space between said scan lens and said object (col. 6, line 45+). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Dixon et al. and Stimson et al. to provide a liquid immersion lens and immersion liquid of Stimson et al. to the imaging system of Dixon et al. One of ordinary skill in the art would have been motivated to do this to provide a large numerical aperture improving resolution and decreasing the time to image an object.

With respect to claim 2, Dixon et al. discloses the system is a confocal imaging system and there is a detection arm located between said object and said detector, said detection arm receiving light from said diffraction-limited configuration in said object plane, said detection arm having a pinhole (138) and a focusing lens (136) to obtain a focal point for confocal detection of said light returning from said object, said detector being located behind said pinhole, there being a beamsplitter (112) located between said detection arm and said object, said beamsplitter directing light returning from said object into said detection arm (fig. 3a).

With respect to claims 7 and 17, Dixon et al. discloses the scan lens may be a telecentric $f^*\theta$ scan lens (400) (fig. 4a). The modification to a liquid immersion scan lens has been described supra regarding claim 1.

With respect to claim 8, Dixon et al. discloses the detector is a spectrally-resolved detector.

With respect to claim 9, Dixon et al. discloses there are means for supporting (208) said object (130) to be observed and measured (fig. 3a).

With respect to claim 10, Dixon et al. discloses a reflection-type microscope but does not disclose a transmission arrangement. However, such arrangements are well known in the art and rearrangement to a transmission-type microscope is well within the ability of one of ordinary skill. A typical transmission-type arrangement would include a second condenser lens and a transmission detector placed on an opposite side of said object, said condenser lens and said transmission detector being coaxial with said scan lens, whereby light transmitted through said specimen is detected. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. and move the detection arm for a variety of reasons including size, balance, or space constraints.

With respect to claim 11, Dixon et al. discloses said illumination source (102) is a laser (fig. 3a).

With respect to claim 14, Dixon et al. discloses said imaging system being a real-time imaging system, there being a rotating Nipkow disk located between said illumination source and said object, said Nipkow disk producing a plurality of expanding beams moving toward said object, there being a focusing lens rigidly mounted a distance equal to a focal length of said focusing lens above an entrance pupil of said scan lens, said focusing lens also being a distance equal to a focal length of said focusing lens below said Nipkow disk, said focusing lens and said scan lens in combination focusing said expanding beams to diffraction-limited configurations in a prescribed object plane, said light from said object plane returning through said Nipkow disk with means for focusing said light returning through said Nipkow disk to produce a real image, said detector detecting said image (col. 6, lines 37-47).

Art Unit: 2872

With respect to claim 15, Stimson et al. discloses the detector a charged coupled array (342) (fig. 3).

With respect to claim 16, Dixon et al. discloses said imaging system is a real-time scanning optical microscope (col. 3, lines 17-30 and col. 6, lines 37-47).

With respect to claim 19, Dixon et al. discloses said diffraction-limited configuration is one of a spot or a line (col. 4, lines 46-49).

With respect to claim 20, Stimson et al. discloses said immersion liquid is one of water or oil (col. 6, lines 44-46).

Claims 1, 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of White et al. (US Patent No. 6,169,289).

With respect to claim 1, Dixon et al. discloses all the limitations of claim 1, except the liquid immersion scan lens as stated supra. White et al. discloses a liquid-immersion scan lens (25) with an immersion liquid filling a space between a scan lens and an object. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. with the lens of White et al. to provide a large numerical aperture improving resolution for the imaging system.

With respect to claim 12, Dixon et al. discloses all the limitations of claim 1, except the liquid-immersion scan lens, as stated supra, and the further limitations of claim 12. However, White et al. discloses a laser rejection filter (not shown) is placed in front of a detector (35), said imaging system being a multi-photon or two photon imaging system wherein an illumination source (11) is a short pulse laser to excite multi-photon or two-photon fluorescence respectively

Art Unit: 2872

in a specimen (22), said laser rejection filter filtering out a signal from said laser, the immersion liquid increasing a numerical aperture of said liquid-immersion scan lens (25), thereby increasing an intensity of light at a focal point of said lens and improving multi-photon or two-photon absorption respectively (col. 5, line 47-col. 6, line 45). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. with the arrangement of White et al. to provide maximum resolution for the imaging system.

With respect to claim 23, Dixon et al. teaches a method of constructing scanning beam optical imaging system for a macroscopic object, said system having a multi-photon laser source producing a light beam directed along an optical path toward an object, a scanner for scanning with a light beam, a detector located to receive light from said object plane and a display to produce a signal from said detector, said method comprising inserting scan lens for focusing said light beam to a diffraction-limited configuration in a prescribed object plane without forming an image plane between said scan lens and said object plane and scanning said light beam using the scanner to remove said diffraction-limited configuration in a predetermined scan pattern on said object plane. Dixon et al. does not teach a short pulse laser or a liquid-immersion scan lens. White et al. teaches both a short pulse laser and a liquid-immersion scan lens as stated supra regarding claim 12. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. with the arrangement of White et al. to provide maximum resolution for the imaging system.

Art Unit: 2872

Claims 13/1 and 13/2/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of Stimson et al. (US Patent No. 6,134,002) and in further view of Guerra (US Patent No. 5,349,443).

Dixon et al. and Stimson et al. teach or suggest all the limitations of claim 1 and 2 as stated supra. Dixon et al. and Stimson et al. are silent to the limitations of claim 13. However, Guerra shows a sidewall (36) surrounding objective lens (10'), said sidewall extending between said scan lens and said object (S), said sidewall having a substantial sealing relationship with said scan lens and said object to retain said immersion liquid (32) of said liquid-immersion scan lens between said scan lens and said object. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. and Stimson et al. to provide a sidewall to contain the immersion liquid. One would be motivated to do this to allow for easy application and cleaning of the liquid.

Claims 18/1, 18/2/1, and 18/14/1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixon et al. (US Patent No. 5,532,873) in view of Stimson et al. (US Patent No. 6,134,002) and in further view of Trappe et al. (US Patent No. 4,208,101).

Dixon et al. and Stimson et al. teach or suggest all the limitations of claims 1, 2, and 14 as stated supra. Dixon et al. and Stimson et al. are silent to the limitations of claim 18. However, Trappe et al. teaches an immersion objective and a part of the lens closest to the object is spring mounted (col. 3, lines 38-44). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Dixon et al. and Stimson et al. to make a part of the lens closest to the object spring mounted. One would be

Art Unit: 2872

motivated to do this to provide an added seal against leaking of the immersion liquid into the objective.

Double Patenting

Claims 1, 2, 7-13, 19, 20, 22, and 23 of this application conflict with claims 7, 13, 15, 17, 18, 20-22, 25, 26, and 41 of Application No. 10/648,450. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 7-13, 19, 20, and 22 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 7, 13, 15, 17, 18, 20-22, 25, 26, and 41 of copending Application No. 10/648,450.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the open-ended transitional word, “comprising,” allows additional limitations to be included.

With respect to claim 1, Application No. 10/648,450 claims all the same limitations in claim 7 including an imaging system for imaging objects, the system comprising: (a) an illumination source; (b) a scan lens; (c) a scanner; (d) the scan lens being a liquid-immersion scan lens; (e) a detector and a display.

Likewise, claims 7, 8, 9, 10, 11, 13, 19, 20, and 22 state at least the same limitations as claims 15, 17, 18, 20, 21, 13, 26, 25, and 41, respectively, of copending Application No. 10/648,450.

Also, claims 2 and 12 are obvious variations of the structure provided by claims 8 and 22, respectively, of copending Application No. 10/648,450.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

Art Unit: 2872

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

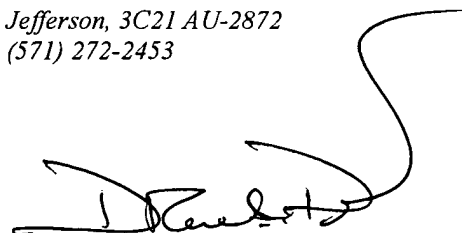
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Consilvio whose telephone number is (571) 272-2453. The examiner can normally be reached on Monday thru Friday, 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Mark Consilvio
USPTO Patent Examiner
Jefferson, 3C21 AU-2872
(571) 272-2453



DREW A. DUNN
SUPERVISORY PATENT EXAMINER